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I. INTRODUCTION

A. THE NEED TO "OPERATE LIKE A BUSINESS"

A water system should be "operated like a business." This is a frequently repeated phrase. But, what is meant by it? Here's one useful way to think about what it means to operate like a business:

> *For a successful business, a manager must be aware of changes taking place in the environment in which the business operates. It is necessary to constantly look to the future to:*
>
> *1) Cope with any **threats** to the survival of the business, and*
>
> *2) Take advantage of **opportunities** to improve the performance of the business.*

In the same way, owners and managers of a water system must look to the future. Such things as the need for financing, the impact of new regulations or the loss of key customers will present management demands that can only be met through sound business planning.

Many water systems were started when the cost of providing water was low and regulatory demands were few. But times have changed! Little remains of the good old days when operating a water utility was a simple job.

This manual has been created to prepare water system owners and operators for an uncertain future by becoming capable business managers and financial planners.

B. BUSINESS PLANNING: GETTING TO YOUR "BOTTOM LINE"

A successful manager relies on a "business plan" to assure a company will be able to meet the changing demands of an uncertain future.

> *A business plan requires a two-sided analysis:*
>
> 1. *Receiving income from sales to pay for capital investments and operating expenditures, and*
> 2. *Spending money to produce a product or service*

In any business plan, the fundamental budget question is the "bottom line" -- whether income received will equal or exceed the money spent. When there is more income than expenses, there is a "positive bottom line," indicating the business has done a good job of planning for challenges, and that the business will be "viable" into the future.

A "negative bottom line" indicates a business has failed to respond to the threats and opportunities. Such a business may be said to be "nonviable" because its ability to survive is unlikely under current conditions. In such circumstances, businesses are often "restructured" to change their costs, their access to capital, or the revenues they receive for products or services, in an attempt to become viable again.

Whether a business is viable or nonviable is directly related to the planning done by company managers. With good information, the picture is black and white. When there is little information on which to build a plan, this picture is only in shades of gray.

Unfortunately, the picture for most small water systems is gray. A lack of information about current operations and absence of planning severely limits the ability of many small systems to meet future challenges. They may not be operated as viable businesses and their survival may be uncertain.

It is out of concern for the "gray area" in which many small systems operate that the Federal government has directed state agencies to implement "capacity development" programs. These programs require that water systems demonstrate their ability to meet future challenges. Chapter 455B.174 of the Iowa Code allows the Director of the Iowa Department of Natural Resources (DNR) to develop such a capacity development process for use by Iowa's public water supplies.

As a result, DNR has developed this self-guided manual for evaluating a system's capabilities and its financial health. With this guide, a manager can create a simple business plan for use in responding to threats and opportunities – a plan that will move the system out of its gray area and into the position of a viable business.

The Goal of Business Planning for Water Systems

By understanding how your water system functions, what must be done in the future to remain in compliance with government regulations, and the financial commitments that must be made, you will be able to position your utility to stay in business. Without sound business planning, it will be difficult, if not impossible, for any small water system to survive in an increasingly complex world. In completing this self-assessment manual, you will take a big step toward tomorrow, for your water system and those who depend upon it.

C. SELF-ASSESSMENT: HOW TO USE THIS BOOK

ASSESSING CAPITAL AND OPERATING COSTS

This self-assessment manual presents a structured series of yes/no questions that follow the three major elements of a complete business plan: 1. A facilities plan (Section II), 2. A management plan (Section III), and 3. A financial plan (Section IV). The questions are intended to guide you in identifying major capital and operating costs that could arise in the future operation of your system -- things that will impact your "bottom line."

> *Within each section of the manual, the questions are grouped according to overall topic areas. Each topic represents an important area where there may be hidden costs in your future. The individual yes/no questions under each topic are intended to stimulate your thinking about the topic in general. In going through them, you should keep the general topic in mind and ask yourself: "Is there anything that could surprise us and cost a lot of money?"*

There are questions covering several major areas impacting your capital and operating costs. The questions are structured such that a "yes" answer means that cost surprises are unlikely and a "no" answer means that cost surprises may occur.

When answering the questions, be honest, and if you don't know an answer, take the time to do some research. You may need to look at other records or find someone to help you understand the topic. Leave these questions blank and complete them later when you have more information.

Some questions may not apply to your system. For example, "groundwater under the influence of a surface water" questions do not apply to groundwater not under the influence of surface water systems. When you encounter such questions, simply cross them out and mark "NA" in the margin next to them, so you will remember to ignore those sections.

HOW DO YOU USE THE RESULTS OF THIS SELF-ASSESSMENT MANUAL?

There is no standard scoring system that can be used to interpret your answer. If you have relatively few "no" answers, the potential for unexpected threats to your continued operation is probably low.

However, it is important for you to think carefully about each "no." Consider what can be done to reduce your liability in each instance and make an estimate about what each "no" might cost you. Ask yourself: "What do all the "no" answers add up to?" "What must be done to change a "no" answer to a "yes?" "Can my system afford it?"

ASSESSING REVENUE REQUIREMENTS AND REVENUE SOURCES

Once you have completed the self-assessment of potential cost concerns, the next step is to examine the other side of the ledger in terms of income you need and the impact on customer rates. The Appendix provides a series of budgeting worksheets that can assist you in using estimates of future costs to develop a good projection of revenue requirements and customer rates.

The planning exercise in the Appendix is designed as a "what-if" budgeting exercise. It will give a glimpse of the future in black and white. Once you begin to examine your system's income requirements in this business-like manner, management choices will become more obvious and agreement among decision-makers about expenditures and rate structures will be easier to achieve.

II. ASSESSING YOUR FACILITIES

A. SUPPLY SOURCES AND FACILITIES

AVAILABILITY AND ADEQUACY OF SUPPLY SOURCES

For many water systems, obtaining a reliable quantity of water is a challenge. In some systems, it is the primary concern. Even if the quantity of water has never been a problem, it is worthwhile to "consider the source" in the future. The more frequently you answer “yes” to the following questions shows how well you have considered future source availability. For questions where your answer is “no,” it should become more clear what steps you might take to better assess the issues involved.

Can existing sources of supply meet existing demands?

✓ YES__ NO__ Do you know how much water you pump on an average day? If yes, _____ gpd*
✓ YES__ NO__ Do you know how much water you pump on a peak day? If yes, _____gpd*
✓ YES__ NO__ Do you know your source capacity in gpd*? If yes, _____gpd*
✓ YES__ NO__ Is your source capacity higher than your instantaneous peak day demand by an adequate margin?
✓ YES__ NO__ Can you meet your instantaneous peak demand without pumping at peak capacity for extended periods?
✓ YES__ NO__ Have you been able to provide adequate volumes of water during recent droughts?
✓ YES__ NO__ Do you have an Emergency Conservation Plan that will allow you to meet system demand during a drought or shortage, such as the loss of your largest well?

gpd* = gallons per day

Do you know how your demand is changing?

✓ YES__ NO__ Do you know whether your system demand will be growing, declining, or remaining stable over the next ten years?
✓ YES__ NO__ If you have large commercial, industrial, or irrigation users, do you know their long-term plans and understand their needs?
✓ YES__ NO__ Will you be capable of meeting your system demands in the future?

If you purchase water, do you fully understand the purchasing arrangement? (If you do not purchase water, skip this section)

✓ YES__ NO__ If you purchase water from another system or a wholesaler, do you know their long-term plans?
✓ YES__ NO__ Do you have a contract to purchase water?
✓ YES__ NO__ Do you know the terms affecting your supply during drought conditions?
✓ YES__ NO__ Are you guaranteed water under all conditions, even during a drought (as part of the terms)?

Are you aware of competing uses of water that draw from the same water source as you do that may impact the availability of water?

✓ YES__ NO__ Are you knowledgeable about other demands being placed on the same water source that you are using?
✓ YES__ NO__ Do you know who the other users are and do you understand their future plans?
✓ YES__ NO__ Do you fully understand your legal rights to the water?

Is your current source the best choice for the long-term?

✓ YES__ NO__ Are alternative water sources possibly available to you?
✓ YES__ NO__ Are you knowledgeable of the characteristics and costs of using alternative sources?

VULNERABILITY OF SUPPLY SOURCES TO CONTAMINATION

It is better to protect water supply sources from being contaminated in the first place, than to try to clean them up afterward with expensive treatment technologies. Water suppliers need to know about the potential sources of contamination that may influence their water. Then you need to assess whether your source water is vulnerable to contamination.

Do you know where your water comes from?

✓ YES__ NO__ Do you know the geological name of the aquifer system from which your water is drawn?
✓ YES__ NO__ Do you know the depth of your well?
✓ YES__ NO__ Do you know the boundaries of your well's recharge area?
✓ YES__ NO__ Have you received your source water assessment results from the State or a contractor?
✓ YES__ NO__ Is your local community interested in participating in source water planning?
✓ YES__ NO__ Do you have a source water protection plan in place?

W***hat potential sources of contamination exist in the recharge area?***

✓ YES__ NO__ Is the recharge area free from discharges of human wastewater treatment facilities or agricultural feedlot waste treatment facilities?
✓ YES__ NO__ Is the recharge area free of any facilities engaged in the production, storage, or handling of agricultural chemicals such as manufacturing plants, warehouses, or farm supply stores?
✓ YES__ NO__ Is the recharge area free of any golf courses, corporate or institutional campuses, or intensively landscaped residential developments?
✓ YES__ NO__ Is the recharge area free of any industrial or commercial establishments engaged in significant uses of organic (e.g. solvents) and inorganic (mining, metallurgy, chemical production, etc.) chemicals as part of production processes?
✓ YES__ NO__ Do you know what crops are grown within the recharge area?
✓ YES__ NO__ Do you know what agricultural chemicals are in most prevalent use for these crops?
✓ YES__ NO__ Do you know what the seasonal patterns of agricultural chemical application are for these crops?
✓ YES__ NO__ Have you asked the county agricultural extension agent about cultivating practices in your area?

B. TREATMENT

TREATMENT: MICROBIOLOGICAL CONTAMINATION

Protecting water supplies from microbiological contamination is a critical utility function. This requires vigilant efforts in source protection, treatment, storage, and distribution. The key is "the multiple barriers approach." First, the water supply needs to be protected from contact with contamination. Second, providing several levels of monitoring and treatment, as well as back-up treatment, will assure control of disease-causing microorganisms. New regulations of the Safe Drinking Water Act (SDWA) will increase the treatment requirements for protection from microbial contamination in both surface and groundwaters.

Your treatment may have to change even if you have never had problems with microbiological contamination. Considerations are different for surface water and groundwater. There are also new considerations for maintaining treated water quality in the distribution system. "No" answers to the following questions may imply the potential for increased treatment costs.

Groundwater Under the Influence of Surface Water (If this section does not apply to your facility, skip it and go to the next section. If you are unsure about whether your system is under the influence of surface water, please contact your local Field Office.)

✓ YES__ NO__	Does your facility provide filtration of the water?
✓ YES__ NO__	Does the type of filtration provided meet the requirement of the Surface Water Treatment Rule and the Interim Enhanced Surface Water Treatment Rule?
✓ YES__ NO__	Is your filter plant well maintained; free from spalling concrete and peeling paint?
✓ YES__ NO__	Are repair parts available?
✓ YES__ NO__	Do you have back-up plans for all units that have an impact on health?
✓ YES__ NO__	Can your plant achieve a filtered water turbidity of 0.1 NTU 95 percent of the time?
✓ YES__ NO__	Is your filtered water turbidity always less than 1.0 NTU?
✓ YES__ NO__	Do you have the capability to add coagulant before the filter?
✓ YES__ NO__	Do you have the capability to individually monitor each filter for turbidity?
✓ YES__ NO__	Do you always follow the manufacturer's instructions for calibrating your turbidimeters?
✓ YES__ NO__	Can your plant meet the current "CT" requirements with a comfortable margin?
✓ YES__ NO__	Has the state performed a "sanitary survey" or "performance evaluation" of your plant recently with satisfactory results?

Groundwater Systems (If your facility is a surface water system or groundwater under the influence of surface water, skip this section. If you are unsure about whether your system is under the influence of surface water, please contact your local Field Office.)

Are you** sure **it's ground water not under the influence of surface water?

✓ YES__ NO__ Are you sure your water supply is really "ground water" and not "ground water under the influence of surface water?"
✓ YES__ NO__ Does your well meet the definition of a deep well as it is defined in Chapter 40 of the Iowa Administrative Code?

("Deep well" means a well located and constructed in such a manner that there is a confining layer of low permeability soil or rock at least 5 feet thick located at least 25 feet below the normal ground surface and above the aquifer from which water is to be drawn.)

✓ YES__ NO__ Is your well located outside the zone of influence of nearby streams or rivers?
✓ YES__ NO__ Is your water free from variations in turbidity and temperature in the period after storm events?

If you do not presently disinfect, will you be able to stay that way? (If you disinfect, skip this section.)

✓ YES__ NO__ Was your well site approved by IDNR?
✓ YES__ NO__ Was your well constructed under a permit issued by IDNR, or does the construction conform to current standards for siting and constructing a well?
✓ YES__ NO__ Is your well shaft encased and is the casing intact?
✓ YES__ NO__ Is your wellhead capped with a pitless adapter that is good enough to prevent contamination from surface water?
✓ YES__ NO__ Has the state performed a "sanitary survey" of your system recently with satisfactory results?
✓ YES__ NO__ Can your wells accommodate disinfection without major reconstruction?

Is your current groundwater disinfection practice providing adequate treatment? (If you do not disinfect, skip this section)

✓ YES__ NO__ Are you using a disinfectant other than chlorine? If so, what? _____
✓ YES__ NO__ Do you regularly inspect and maintain your chlorine dosing equipment?
✓ YES__ NO__ Do you have back-up equipment?
✓ YES__ NO__ Do you have adequate contact time following disinfection and before the first user in the distribution system?
✓ YES__ NO__ Can you detect a chlorine residual at taps throughout the distribution system?

Distribution Systems

Are you free from the risk of having hidden problems arise during distribution?

✓ YES__ NO__ Is your system free of compliance problems with the Coliform Rule?
✓ YES__ NO__ Is your system free of complaints regarding the taste and odor of chlorine?
✓ YES__ NO__ There is now an upper limit on the chlorine concentration in finished water, set at 4.0 mg/L. Are your residuals comfortably below this level?
✓ YES__ NO__ Can you maintain adequate pressure in the distribution system under all conditions of flow?

TREATMENT: CORROSION CONTROL

Lead and copper occur in trace amounts in tap water, some times as by-products of corrosion from pipe materials and plumbing fixtures. The allowable concentrations of these metals are governed by "The Lead and Copper Rule." There is going to be a continuing need for careful fine-tuning and adjustment of corrosion control treatment, consisting of pH and alkalinity adjustment and/or addition of chemical additives that act as corrosion inhibitors. While this does not require great capital expenditures, it requires operator diligence and entails chemical costs.

Are you likely to have to change treatment to control for corrosion by-products?

✓ YES__ NO__ Have your first draw monitoring results been comfortably below 15 ug/L for lead and 1.3 mg/L for copper?
✓ YES__ NO__ Is your treated water considered to be non-corrosive?
✓ YES__ NO__ Can your system accommodate corrosion control treatment without major reconstruction?

TREATMENT: RADIONUCLIDES

Naturally occurring radiological materials are present in ground and surface waters as a result of gradual weathering of geologic materials. SDWA regulations governing contamination with radionuclides are still being actively debated and it may be a while before they are finally settled. However, it may be worthwhile to assess the potential susceptibility of your water source to this type of contamination to get an advance notice of possible compliance problems.

Radon gas is present in groundwaters throughout the United States. It is not present in surface waters because they are naturally aerated. The pattern of occurrence in groundwaters is sporadic. There can be wide variability in the levels detected between directly adjacent wells and within the same well under different pumping and drawdown conditions. Therefore, the only means of knowing for certain is to monitor your well supply.

Are you likely to have to change treatment to control for Radon?

✓ YES__ NO__ Have you monitored your water for radon?
✓ YES__ NO__ If yes, are your radon levels comfortably below 1,000 pCi/L?

If there is no radon detected in your well, it is likely you have no compliance problems. If there is substantially more than 1000 picocuries per liter of radon in your well, aeration or other treatment may lie in your future. If there is radon present at levels below 1000 picocuries per liter, the need for treatment will remain unknown until standards are set.

Are you likely to have to change treatment to control for Radium?

✓ YES__ NO__ Are levels of radium (226 and 228 combined) in your water comfortably below 5 pCi/L?
✓ YES__ NO__ Are levels of radium 228 in your water comfortably below 3 pCi/L?
✓ YES__ NO__ Are levels of gross alpha (including radium 226, excluding radon and uranium) comfortably below 15 pCi/L?

If you are above these levels, you may need to install treatment equipment to remove radium. Treatment may consist of lime softening, ion exchange, or reverse osmosis.

TREATMENT: INORGANIC CONTAMINANTS

- Arsenic has very active and complex chemistry. As a result, it exists in a variety of chemical forms and is widely distributed in the environment at trace levels. It is associated with a variety of health effects. Treatment choices include coagulation/filtration, lime softening, and ion exchange.

Are you likely to have to change treatment to control for arsenic?

✓ YES__ NO__ Are your levels of arsenic comfortably below 0.01 mg/L? If not, you may have to treat for arsenic in the future.

- Fluoride is naturally occurring, although it is also added to treated water to provide dental benefits. However, excessive fluoride can be harmful.

Are you likely to have to change treatment to control for fluoride?

✓ YES__ NO__ Are your levels of fluoride comfortably below 4 mg/L? If not, you may have to treat for fluoride.

Nitrate and nitrite are naturally occurring, but elevated levels of nitrate/nitrite are a problem in agricultural areas. The health issues associated with nitrate/nitrite involve acute effects on children, causing it to warrant serious attention.

Are you likely to have to change treatment to control for Nitrate?

✓ YES__ NO__ Are your levels of nitrate comfortably below 10 mg/L? If not, you may have to treat for nitrates.
✓ YES__ NO__ Are your levels of nitrite comfortably below 1 mg/L? If not, you may have to treat for nitrites.
✓ YES__ NO__ Is your source water free from ammonia? If not, you may have to treat for nitrites.
✓ YES__ NO__ Are your levels of ammonia comfortably below 1 mg/L? If not, you may have to treat for nitrites.

TREATMENT: PESTICIDES AND HERBICIDES

Removal of organic chemicals used as pesticides and herbicides can involve expensive treatment using granular activated carbon (GAC). Fortunately, only a small percentage of water systems are expected to have levels of contamination that exceed the SDWA standards. However, the presence of these chemicals indicates the existence of an active pathway from a farmer's field, a golf course, or other cultivated or landscaped area to the river or aquifer from which your supply is withdrawn. "No" answers to the following questions may imply that your water system may have to treat to remove these contaminants.

Are you likely to have to change treatment to control for pesticides and herbicides?

✓ YES__ NO__ Are your compliance monitoring results well below the Maximum Contaminant Levels for regulated pesticides and herbicides?

TREATMENT: INDUSTRIAL/COMMERCIAL CHEMICALS

The organic and inorganic chemicals typically associated with news stories about hazardous waste disposal sites are covered by the Phase I, Phase II, and Phase V SDWA regulations. Most wells are not adjacent to hazardous waste sites and most will not exhibit this sort of contamination except at very low levels.

The Phase I SDWA regulations cover Volatile Organic Compounds (VOCs) used as solvents for a multitude of industrial and commercial applications. Although as many as 20 percent of wells may have traces of VOCs present, less than 1 percent have concentrations high enough to require treatment. The typical treatment for these VOCs is aeration. VOCs are primarily a groundwater contaminant because they escape from surface waters through natural aeration. VOCs are valuable as an indicator chemical. Since they are organic solvents, they are very mobile through soils and groundwater formations. Thus, if you have wells that have tested positive for VOCs -- even if at very low levels -- it is evidence that there is a pathway from the source of the pollution to your well. Where there are VOCs, there are often other organic and inorganic contaminants as well. Whereas removal of VOCs via aeration may be relatively inexpensive, treatment to remove other organics and inorganics may require much more expensive technologies such as granular activated carbon (GAC) or ion exchange.

Are you likely to have to change treatment to control for industrial/commercial chemicals?

✓ YES__ NO__ Are your compliance monitoring results free of detection for regulated VOCs?

✓ YES__ NO__ Are your compliance monitoring results comfortably below the Maximum Contaminant Levels for regulated organic and inorganic chemicals?

C. INFRASTRUCTURE

INFRASTRUCTURE: PUMPING

Pumping is one of the most critical functions in operating small and individual water distribution systems. Some of the most common centrifugal or jet pump problems have symptoms that are easily recognizable by experienced operators and can be corrected relatively easily. Some of the problems are minor in nature and can be avoided entirely if a preventative maintenance program is established and adhered to over the long-term.

Is your pumping equipment maintained in good condition?

✓ YES__ NO__ Do you routinely trouble-shoot for signs of pump or pump motor problems?

✓ YES__ NO__ Once diagnosed, are problems corrected in a timely enough manner to avoid crisis financing, costly repairs and unscheduled downtime?

✓ YES__ NO__ Do you hire a qualified pump or well contractor to perform an inspection of all pumping equipment, identify potential problems, and perform maintenance, on an annual basis?

Do you have adequate standby/emergency power equipment and preparedness?

✓ YES__ NO__ Is there sufficient standby/emergency power capacity to supply 100% of the demand of the system (excluding fire demands) long enough to last through the length of your most likely power outage situations?

✓ YES__ NO__ Are any existing standby/emergency power equipment, controls and switches tested or exercised routinely under load conditions, for at least 30 minutes at a time?

✓ YES__ NO__ Has the local electric utility been made aware of the standby/emergency power provisions made by the water system, so that they can reinforce and safeguard the electrical facilities serving the water operations?

INFRASTRUCTURE: STORAGE

Hydropneumatic storage tanks are primarily used on small water systems to reduce the number of pump starts per hour. Storage tanks operate as integral parts of the system of pumps, pipes, and connected pressure loads. In operation, all the parts respond to pressure changes as the system follows the daily and seasonal demands. The following questions are designed to help determine if there are problems in the storage facilities that could become major capital outlays to correct.

Can your hydropneumatic tank meet your needs?

✓ YES__ NO__ Is your hydropneumatic tank completely above grade and housed in a secure, heated building?
✓ YES__ NO__ Is the building that houses your tank in good repair?
✓ YES__ NO__ Is your hydropneumatic tank well-maintained and free of rust?
✓ YES__ NO__ Is the paint on the tank in good condition?
✓ YES__ NO__ Has the inside of the tank been inspected within the past 3 years and found to be in good condition?
✓ YES__ NO__ Is the gross volume of your tank at least ten times the capacity of your largest pump?
✓ YES__ NO__ Does your tank have an access manhole?
✓ YES__ NO__ Does your tank have a rubber diaphragm bladder to separate the air from the water? (If yes, skip the next three questions)
✓ YES__ NO__ Does your tank have an air compressor for adding air?
✓ YES__ NO__ Does your tank have a vent to blow off air?
✓ YES__ NO__ Does your tank have a water sight gauge?

INFRASTRUCTURE: DISTRIBUTION

The increasing cost of water has had implications on the distribution functions of water utilities. The break-even point for replacing leaking mains versus tolerating some water loss has shifted. Reducing overall, unaccounted-for water loss has become an important objective. The proper management of a utility's transmission and distribution system includes maintenance, system upgrade, hydrant and meter testing, and repair and replacement of mains. The distribution facilities of a water utility are a measure of its service flexibility and growth potential. The following series of questions are designed to assist in identifying potential operational and maintenance problems in the distribution and transmission systems.

Is the system being maintained in good condition?

✓ YES__ NO__ Do you routinely flush, test and maintain the hydrants in the system?
✓ YES__ NO__ Are the location of valves in the mains and curb stops on the service lines precisely known?
✓ YES__ NO__ Are histories, locations, size, and type of service lines and mains detailed on records in a secure area?

✓ YES__ NO__ Are all valves exercised periodically?
✓ YES__ NO__ Is the system free of severe "water hammer" problems?
✓ YES__ NO__ Are meter pits, pressure regulating valves, altitude valves, blow-offs, and other appurtenances maintained on a regular basis?
✓ YES__ NO__ Are the valves in the distribution system located so that when repairing leaks, the amount of wasted water and the risk of back-siphoning is minimized?
✓ YES__ NO__ Is the location of all distribution valves precisely known?
✓ YES__ NO__ When valves are found to be inoperable, are they replaced in a timely manner?
✓ YES__ NO__ Are all valves and hydrants recorded on maps and records and stored a secure place?
✓ YES__ NO__ Are there “problem” mains/services in the distribution system?
✓ YES__ NO__ Is there a plan in place to replace “problem” mains in the distribution system?
✓ YES__ NO__ Is your system free of asbestos?

Is unaccounted-for water being addressed and minimized?

✓ YES__ NO__ Is the amount of unaccounted-for water in the water system determined each month?
✓ YES__ NO__ Is the unaccounted-for water less than 15 percent of the total water delivered to the mains?
✓ YES__ NO__ Are the operating pressures in the water system between 35 psi and 85 psi at the service connections of each customer?
✓ YES__ NO__ Do you have a routine leak detection and repair program?
✓ YES__ NO__ Are all sources of supply metered?
✓ YES__ NO__ Are all customers metered?
✓ YES__ NO__ Are the meters calibrated and tested routinely to assure their accuracy and reliability?

Are water quality aspects of distribution receiving needed attention?

✓ YES__ NO__ Is an annual inspection for cross connection performed by the system operator?
✓ YES__ NO__ Is there a program for installing and testing backflow prevention devices where potential contamination is present?
✓ YES__ NO__ Is there a program to eliminate "dead ends" in the mains, where feasible?
✓ YES__ NO__ Are system operators knowledgeable in the identification and potential dangers of cross-connections?

Are there acceptable standards governing modifications and new construction?

✓ YES__ NO__ Is there a low percentage of mains 4" diameter or less in the water system?
✓ YES__ NO__ Is there a program to gradually replace sub-standard sized mains?
✓ YES__ NO__ Are there suitable rights-of-way and easements provided to the water system for expansion, maintenance and replacement of mains and services?
✓ YES__ NO__ Is there sufficient earth cover to protect the mains from frost damage or heavy loads, if driven over?
✓ YES__ NO__ Are materials of mains designed and selected to resist corrosion, electrolysis, and deterioration?

III. ASSESSING YOUR MANAGEMENT CAPABILITIES

A. OPERATION & MAINTENANCE

Historically, the major element in a small water system was the distribution system. Source development and treatment costs were trivially small -- all that was required in many cases was a well, a pump, a tank, and perhaps a chlorinator. Operational demands were also very limited. Now, the operational demands placed on small systems are rising to unprecedented levels. Some indication of whether these operational needs can be met is provided through consideration of the following series of questions. "No" answers to the following questions indicate that the water system's future operational needs may not be fully met.

Does your operations staff have the right training and credentials?

✓ YES__ NO Is the person operating your treatment system certified to operate your system?
✓ YES__ NO__ Is the person operating your distribution system certified to operate it?
✓ YES__ NO__ Does your operator receive training on an ongoing basis to keep abreast of current developments in the water field?
✓ YES__ NO__ If you have a contract operator by affidavit, do you know how frequently they visit the plant?
✓ YES__ NO__ Do you have a back-up operator?

Does your staff fully understand and meet all current monitoring requirements?

✓ YES__ NO__ Does your facility have a record free of monitoring violations?

Are you confident you understand what it will take to meet future operational demands?

✓ YES__ NO__ Can you make an appraisal of the additional operational requirements on your water system based on the categories of questions presented above? (Do you know how this forecast matches up against your current level of operational capability?)
✓ YES__ NO__ Does your water system obtain any regular or occasional technical assistance from outside sources, such as the state, your engineer, other utilities, or organizations specifically dedicated to providing technical assistance?
✓ YES__ NO__ Are you aware of all the assistance programs that are available to you, including the Drinking Water State Revolving Fund?

B. MANAGEMENT & ADMINISTRATION

As the list of quantity, quality, and infrastructure needs implied by all of the above questions grows larger and larger, the extent of management systems needed to meet all these needs also grows. The following questions highlight the general types of management systems that should exist in some form. Although some of these items may sound sophisticated, they can exist in very simple forms and get the job done very effectively. As a general rule, they need be no more sophisticated than necessary to meet the needs of the system. The important issue is that the need for management systems is recognized and is being met. "No" answers to the following questions imply that your water system may have inadequate management systems.

Is it clear who is in charge of what?

✓ YES__ NO__ Is there a clear plan of organization and control among the people responsible for management and operation of the system?
✓ YES__ NO__ Are the limits of the operator's authority clearly known?
✓ YES__ NO__ Are all the specific functional areas of operations and management assigned?
✓ YES__ NO__ Does everyone involved in operations know who is responsible for each area?
✓ YES__ NO__ Is someone responsible for scheduling work?
✓ YES__ NO__ Is your system represented by an attorney?
✓ YES__ NO__ Is someone responsible for inspecting new construction to ensure adherence to approved plans and specifications?

Are there clear rules and standards?

✓ YES__ NO__ Do you have explicit rules and standards for system modifications?
✓ YES__ NO__ Do you have rules governing new hook-ups?
✓ YES__ NO__ Do you have a main extension policy?
✓ YES__ NO__ Do you have standard construction specifications to be followed?
✓ YES__ NO__ Do you have measures to assure cross-connection control and backflow prevention?
✓ YES__ NO__ Do you have policies or rules describing customer rights and responsibilities?

Do you have a deliberately organized regulatory compliance program?

✓ YES__ NO__ Do you fully understand monitoring requirements and have a scheduling mechanism to assure compliance?
✓ YES__ NO__ Do you have a mechanism to obtain the most recent information on regulatory requirements?
✓ YES__ NO__ Do you know how to obtain clarification or explanation of requirements?
✓ YES__ NO__ Do you maintain adequate records to document compliance?
✓ YES__ NO__ Do you know what to do in the event of a violation?
✓ YES__ NO__ Do you understand the requirements of the Consumer Confidence Rule?
✓ YES__ NO__ Do you have a mechanism for distributing information to your customers and consumers? If so, what? _____

Are you prepared to handle emergencies?

✓ YES__ NO__ Do you have an emergency response plan?
✓ YES__ NO__ Is there a contingency for making emergency interconnections to neighboring systems, and do you know they will work when needed?
✓ YES__ NO__ Does everyone involved in operations know what they are to do in the event of contamination from a toxic or hazardous waste spill in your source water or a main break or a tank failure?
✓ YES__ NO__ Do you have a clear chain-of-command protocol for emergency action?
✓ YES__ NO__ Is someone responsible for emergency operations, for communications with state regulators, for customer relations, for media relations?

Are your operations conducted safely?

✓ YES__ NO__ Do you have a safety program defining measures to be taken if someone gets hurt?
✓ YES__ NO__ Does everyone understand the risks and safety measures involved in handling water treatment chemicals?
✓ YES__ NO__ Do you have written operating procedures for both routine and emergency system operations?
✓ YES__ NO__ Are you fully aware of OSHA confined space regulations?

Do you have an organized approach to maintenance?

✓ YES__ NO__ Do you have a system for scheduling routine preventive maintenance?
✓ YES__ NO__ Do you have a system for assuring adequate inventory of essential spare parts and back-up equipment?
✓ YES__ NO__ Do you have relationships with contractors and equipment vendors to assure prompt priority service?
✓ YES__ NO__ Do you have records and data management systems for system operating and maintenance data, for regulatory compliance data, and for system management and administration?

Is your management capability complete?

✓ YES__ NO__ Are you getting the outside services and technical assistance you need? Do you have adequate legal counsel, insurance, engineering advice, technical/operations assistance, rate case preparation, and financial advice?

IV. ASSESSING YOUR FINANCES

The answers to all of the above questions may have alerted you to the potential for higher levels of both capital and operating costs. Any system that can show that they have anticipated all their needs and that they are prepared to charge a rate sufficient to meet the annual revenue requirement implied by those needs, is a system that can obtain capital financing and can pay its bills -- it is financially viable. The following questions illustrate some features of "good" financial planning and management to serve as points of comparison for self-assessment. Although every system cannot achieve perfection, the more "yes" answers you have, the better. The Appendix provides worksheets that you can use to assess projected costs, financing, and revenue requirements.

Are current financial planning mechanisms adequate?

✓ YES__ NO__ Do you have an annual budget?
✓ YES__ NO__ Do you know how to appropriately set water rates?
✓ YES__ NO__ Does your budget process provide for depreciation of the existing plant or funding of reserves?
✓ YES__ NO__ Do you regularly review your water rates?
✓ YES__ NO__ Do you have a capital budget or capital improvement plan that projects future capital investment needs (at least five years) into the future?
✓ YES__ NO__ Do you have a process for scheduling and committing to capital projects?
✓ YES__ NO__ Does your planning process account for all the potential capital needs suggested by all of the preceding questions in this manual?
✓ YES__ NO__ Does your long-term planning incorporate analysis of different methods that might offer cost savings to customers, such as consolidation with other nearby systems or sharing operations and management expenses with other nearby systems?
✓ YES__ NO__ Have you budgeted for the expense of the Consumer Confidence Rule?

Are current financial management mechanisms adequate?

✓ YES__ NO__ Does your water system presently operate on a break-even basis? If yes, does it generate surplus revenue?
✓ YES__ NO__ Does the water system keep all the water revenues (i.e., water revenue does not support other municipal departments or unrelated activities)?
✓ YES__ NO__ Do you employ standardized Generally Accepted Accounting Principles and tracking systems?
✓ YES__ NO__ Do you track budget performance?
✓ YES__ NO__ Do you have procedures for billing and collection?
✓ YES__ NO__ Do you keep records to substantiate depreciation of fixed assets and accounting for reserve funds?
✓ YES__ NO__ Are financial management recordkeeping systems organized?
✓ YES__ NO__ Are controls exercised over expenditures?
✓ YES__ NO__ Are controls exercised to keep from exceeding your budget?
✓ YES__ NO__ Are there purchasing procedures?
✓ YES__ NO__ Are there procedures for selection of outside contractors and suppliers?

V. PUTTING IT ALL TOGETHER: WHAT'S YOUR PLAN TO MEET THE FUTURE?

After progressing through all of the questions in this self-assessment manual, you should be in a position to summarize what you have learned about your status.

- First, you should have a list of items that need more research or investigation to fully answer the question, or to reverse your answer from "no" to "yes."

- Second, you should be able to make a qualitative summary of what you have learned by taking a clean sheet of paper and filling in the most important things that come to mind -- reflecting on the issues raised in this manual -- under the following headings:

  strengths
  weaknesses
  opportunities
  threats

- Third, perhaps with some additional research -- or with the right assistance -- you may be within range of being able to begin the more quantitative form of business planning outlined in the budget and revenue planning worksheets contained in the Appendix.

Finally, customer awareness of the issues covered by the preceding questions in this manual is the true foundation of viability. Getting customers to fully appreciate what it takes to operate and maintain a water system is important to assure support for new capital investment and higher water rates. The more customers know about the cost to run a proper water system in the future, the more open-minded they are likely to be in considering alternative strategies for providing water service, conceivably at lower cost. Nothing focuses the mind like cost estimates. Once you have performed an analysis of prospective future liabilities and costs following the questions in this manual, you will have the information needed to begin to get people to focus on the choices involved in determining your future.

The final question, after making it all the way through these questions, to ask yourself is: How ***much of all this is known and understood by the customers; and how would this change their attitudes about the future?***

For more information or assistance in using this manual, contact:

Iowa Department of Natural Resources
Water Supply Section
900 East Grand
Des Moines, Iowa 50319-0034

VI. APPENDIX: BUDGETING WORKSHEETS

The Appendix includes four budgeting worksheets. Each worksheet provides space for budget data from the prior year, current year, and four years into the future. If you do not have access to historical data fill in only what is known. However, it is important to be as complete as possible. Worksheet A is an expense budget, Worksheet B is a capital budget, and Worksheet C is a reserve budget. These first three worksheets (A, B, and C) lead into Worksheet D which compares total revenue sources with the total revenue requirement of the water system. Together, these four worksheets provide you with a tool by which you can project the future financial needs of the system and your availability to meet these needs -- or the system's financial viability.

WORKSHEET A - EXPENSE BUDGET

Expenses

Personnel costs. Enter the cost of salaries and benefits of the water system's operators and administrative employees.

Utilities. Enter the annual utility bill of the water system. Utilities include any power supply, including gas and electric, water supply, sewage treatment, and telephone/fax bills among others.

Outside services. Enter the total cost of any services that the water system hires another company or individual to perform. These services can include, but are not limited to, the provision of insurance, external auditors and other accounting services, legal services, architects, engineers, consultants, etc.

Small equipment, materials, and parts. Enter the total annual cost of any equipment, materials, and parts that are purchased to make repairs or otherwise maintain the water system. Only enter those items that will be paid for in a single year. Other items that have a long life (ten or fifteen years at a minimum), have a high cost that must be paid for over time, and are nonrecurring should be added to capital outlays on Worksheet B.

Purchased water. Enter the total annual cost of any water that the water system purchases from other sources and then redistributes to the customers of the water system.

Chemicals, treatment, and monitoring. Enter the total annual cost of water treatment chemicals, other costs associated with treating the water, and the cost of monitoring water quality, including the cost of all monitoring and testing equipment.

Transportation. Enter the costs that the water system incurs for transportation-related expenses. Among others, these include the direct cost of vehicles and vehicle maintenance and repair.

Office supplies. Enter the cost of supplies that are used in administrative work. These supplies include paper, pens, etc.

Customer billing and collection. Enter the expenses that the water system incurs in sending out customer bills and collecting payments (do not include the associated costs of personnel nor outside services).

Income Taxes. Enter the amount of the water system's annual income taxes, if applicable.

Payments in lieu of taxes. Enter the value of any taxes paid on property or any payments made in lieu of taxes.

Other. Several blank lines are available to enter other expenses not included above that the water system may incur.

Depreciation Expense. Depreciation refers to the decrease in value of property, plant, and equipment over time. If it is not a practice of your water system to account for depreciation, leave the depreciation expense line blank.

If it is a practice of your water system to account for depreciation and you contribute to a replacement/depreciation fund each year and the amount that you contribute is greater than or equal to your annual depreciation expense, leave depreciation expense blank. However, if you do not have a replacement fund or contribute significantly less to your replacement fund than the value of your depreciation expense enter your depreciation expense on Worksheet A.

Total Expenses. Enter the sum of all the expenses listed above.

WORKSHEET B - CAPITAL BUDGET

Capital Outlays

New Capital Facilities. Enter the sum of all costs that are associated with purchasing or constructing new facilities for the water system whose costs involve multiple-year commitments. These items may include the pumping station, distribution pipes, storage tanks, treatment plant, and other buildings and equipment.

Renewal and Replacement Facilities. Enter the sum of all costs that are associated with purchasing or constructing renewal or replacement facilities for the water system that involve multiple-year commitments.

Other. Several blank lines are available to enter capital outlays of the system that are not included in the two previous categories.

Total Capital Outlays. Enter the sum of the capital outlays listed above.

Capital Sources

Loan/Bond Proceeds. Enter the amount of money the water system obtains through borrowing, including bank loans, the issuing of bonds, etc.

Equity. Enter the amount of contributions that the water system receives in exchange for a right, claim, or interest in the water system.

Contributions/Connection Fees. Enter the sum of funds that the water system receives from construction assistance contributions or from the imposition of fees on the extension of services.

Draw from Replacement Reserve. Enter the amount of money that the water system used from its replacement reserve to finance capital projects.

Other. Several blank lines are available to enter capital sources of the system that are not included in the previous categories. **Include any grant funds that are received.**

Total Capital Sources. Enter the sum of the capital sources noted above.

Net Capital. Subtract total capital sources from total capital outlays. Ideally, the net capital of the water system should equal zero. The goal should be to balance the flows of capital outlays and capital sources. If the net capital figure is positive the water system has inadequate capital sources to meet its capital outlays. If net capital is negative the water system has more funds than necessary to finance capital improvements. It is important to note that in a given year net capital may vary significantly due to the timing of cash flows. For example, the year in which a large bond issue is made, to pay for a multi-year construction project, capital sources may outweigh capital outlays significantly.

Capital Financing

Principal, Interest, and Return on Equity. Enter the amount that the water system repays annually on all debt and equity incurred to finance capital projects, including both principal and interest payments.

Other. Several blank lines are available to enter other capital financing of the system that is not included in the previous category.

Total Capital Financing. Enter the sum of all capital financing of the water system listed above.

WORKSHEET C - RESERVES BUDGET

Reserve for _____. Lines 1C, 5C, 9C, and 13C are available to enter the reserve accounts that the water system uses. Examples of reserve accounts include:

- ***Operating Cash Reserve;***
- ***Replacement/Depreciation Reserve;***
- ***Emergency Reserve; and***
- ***Debt Service Reserve.***

The annual installment to the reserve account should equal the desired balance of the reserve divided by the number of years before that balance needs to be reached. The desired or target balance should be sufficient to replace depreciated equipment, address the worst emergency situation, or support the issuance of debt. The amount that is desired or targeted for future needs should be noted on lines 4C, 8C, 12C, and 16C. Also, denote the current running balance of each reserve account (on lines 3C, 7C, 11C, and 15C).

Total Annual Reserve Installments. Denote the total amount of money that the water system allocates to all reserve accounts annually.

Total Running Balance. Denote the total amount of money in all reserve accounts.

Total Target Balance. Denote the total desired or targeted balance of all reserve accounts.

WORKSHEET D - REVENUE ANALYSIS

Revenue Requirements

Enter the value of total expenses, net capital, total capital financing, and total annual reserve installments from the previous forms as noted.

Total Revenue Requirement. Together the items mentioned above encompass the revenue requirement of the water system. Enter the total of these items here.

Number of Connections. Enter the number of connections that the water system serves or expects to serve in future years.

(000's) Gallons Sold. In thousands, enter the total number of gallons of water the water system sells or expects to sell annually.

Revenue Requirement per Number of Connections. Divide the total revenue requirement by the number of connections.

Revenue Requirement per Thousand Gallons Sold. Divide the total revenue requirement by the gallons sold in thousands.

Current Revenue[1]

Rate Revenue. Enter the total amount of revenue that the water system collects through the levying of rates on water usage.

Other. Blank lines are available to enter other sources of revenue. These sources may include, but are not limited to, the following:

- Bulk Water Rates;
- Fire Protection; and
- Fees and Charges (bad check fees, reconnect fees, meter testing fees, late payment charges).

If the water system has more sources of revenue than available blank lines, group similar revenues together into broader categories and note these groupings for future reference.

Total Revenue. Enter the sum of all revenue collected by the water system.

Budget Surplus (Deficit). Subtract the water system's total revenue requirement from its total revenue.

Total Revenue per Number of Connections. Divide the total revenue by the number of connections.

Total Revenue per Thousand Gallons Sold. Divide the total revenue by the gallons sold in thousands.

[1] NOTE: Future revenues are difficult to predict. Enter revenue values for years 1 to 4 only if the water system has the capability to accurately forecast these values.